ABSTRACT: A mechanism for transferring containers between axially aligned reel and spiral cookers and coolers which mechanism includes a pair of turrets having container-holding pockets in their peripheries, each turret axis being mounted in a common plane at a 45° angle with the longitudinal axes of the cooker and cooler, the turrets being rotatable so that the pockets of one turret will confront the outlet of the cooker to receive a container and upon rotation will move the container into confronting relation with a pocket of the second turret, the pockets of said second turret being rotatable from a position confronting a pocket of said first turret into confronting relation with the inlet of the cooler so that a container may be transferred from the cooker to the cooler. The turret pockets may be constructed in the form of a rotary pressure valve.
CONTAINER TRANSFER MECHANISM

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention pertains to the art of transfer conveyors and more specifically to conveyors for transferring containers between axially aligned food processing devices.

2. Description of the Prior Art

Normally reel and spiral-type cookers and coolers are not connected in axial alignment but are arranged side-by-side or in staggered arrangements as indicated in Wilbur U.S. Pat. No. 2,536,115 so that the rotary pressure discharge valve of one heat treatment apparatus will serve as the inlet valve for the next apparatus.

However, certain axial aligned cookers and coolers are known in the art. In general, these prior art mechanisms that are used for transferring containers between axial aligned cookers and coolers have taken the form of a reel and spiral, as exemplified by the Thompson U.S. Pat. No. 1,241,168 or as chutes as exemplified by the Thompson U.S. Pat. No. 1,694,996. Turret-type transfer mechanisms which rely on a 45° turret are known but have in the past been limited to 90° transfer as shown in the Jefferies et al. U.S. Pat. No. 1,015,519.

Some prior art devices are not adapted to transfer containers between a cooker and cooler that are maintained at different pressures but will operate only when both the cooker and cooler are at the same pressure unless separate pressure valves are provided.

SUMMARY OF THE INVENTION

The transfer mechanism of the present invention includes a pair of cooperating 45° pocketed turrets which reliably and accurately transfer containers from one reel and spiral heat treatment apparatus to another that is axially aligned therewith. During transfer, the containers are under complete control and are not subjected to excessive wear or denting.

Also, in accordance with the second embodiment of the invention the pockets of both transfer turrets are sealed to their housings thus acting as pressure valves which will retain a superatmospheric pressure in one heat treatment apparatus and will maintain a different pressure in the other heat treatment apparatus.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a fragmentary elevation of a cooker and cooler interconnected by a first embodiment of the article transfer mechanism of the present invention, certain parts being shown in vertical central section.

FIG. 2 is a horizontal section taken along lines 2-2 of FIG. 1.

FIG. 3 is an end elevation with parts broken away illustrating a reel and spiral-type cooker.

FIG. 4 is a schematic elevation illustrating the drive arrangement employed with the transfer mechanism shown in FIG. 2.

FIG. 5 is an enlarged fragmentary vertical section taken along lines 5-5 of FIG. 4 illustrating a transfer star wheel.

FIG. 6 is a vertical central section taken along lines 6-6 of FIG. 2.

FIG. 6A is a section taken along lines 6A-6A of FIG. 2 illustrating the manner in which the guide track supports the containers at the transfer station.

FIG. 7 is a vertical central section taken along lines 7-7 of FIG. 8 through a second embodiment of the container transfer mechanism of the present invention, which mechanism is adapted to act as a rotary pressure valve.

FIG. 8 is a plan of the mechanism of FIG. 7, certain parts being broken away.

FIG. 9 is an enlarged vertical section showing the transfer station of the transfer turrets.

FIG. 10 is an enlarged section taken along lines 10-10 of FIG. 9 illustrating the structure for transferring the containers from the receiving turret to the delivering turret.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The transfer mechanism 10 (FIGS. 1 to 6) of the present invention is associated with a reel and spiral-type heat treatment apparatus such as a cooker 12 and a cooler 14 that are disposed in axial alignment.

The cooker and cooler each includes a cylindrical housing 16, 16' (FIGS. 1, 3 and 4) having end walls 18, 18' in which aligned shafts 20, 20' are journaled and are connected together by a flexible coupling 22. Each shaft 20, 20' supports a reel 24, 24' which has a plurality of pegs or bars or carriers 26, 26' on their peripheries that extend substantially the full length of the associated housing 16, 16'. A generally spiral track 28, 28' of T-shaped cross section is rigidly secured to the associated cooker and cooler housings and each spiral track extends substantially the full length of its associated housing.

The reels 24, 24' are continuously driven in the direction indicated by the arrows A by a motor M (FIG. 4) which drives a pinion 32 that meshes with a bull gear 34 keyed to the cooler shaft 20'.

Containers C to be processed are directed into the cooker 12 by a driven rotary pressure feed valve 36 (FIGS. 3 and 4) of standard well-known design. Each container is received in one of the elongated carries 26 and is advanced thereby into registration with the stationary cooker spiral track 28 which advances the containers spirally within the cooker to the transfer mechanism 10 of the present invention. The mechanism 10 receives the containers from the discharge opening 37 of the cooker 12 and moves them through the inlet opening 38 and into the carries 26' of the cooler 14. The spiral track 28' of the cooler 14 then advances the containers spirally therefor by acceptance by a rotary pressure discharge valve 40, (FIG. 4) all of standard well-known design. The valve 40 discharges the cooked and cooled containers from the system in the usual manner.

The rotary pressure feed valve 36 and discharge valve 40 are of conventional design and include pocketed rotors 41 (FIG. 3) which are driven in timed relation with the two reels 24, 24' by drive means to be described hereinafter. If a more detailed description of the pressure feed and discharge valves, or the construction of the cooker and cooler is desired, reference may be had to the aforementioned Wilbur patent.

The container transfer mechanism 10 FIGS. 1 and 2) comprises a receiving turret 44 associated with the cooker 12 and delivery turret 46 associated with the cooler 14. The turrets 44 and 46 are keyed to shafts 48 and 50, respectively, which lie in a common plane, and, are disposed at 90° to each other, and are disposed at 45° to the axes of the reel shafts 20, 20' which also lie in said common plane. As indicated in the drawings, the common plane of the several shafts is a vertical plane, however, it will be understood that, if desired, a common plane may be inclined either to the right or to the left of the reel shafts in a manner similar to that of the feed valve 36 or discharge valve 40.

The receiving turret 44 includes a plurality of evenly spaced concave receiving pockets P1 which have their longitudinal axes parallel to the shaft 20 when in their lowermost position aligned with the discharge opening 37 (FIG. 1) of the cooker. The pockets P1 register with similar delivery pockets P2 of the delivery turret 46 at the uppermost portion of their travel at which time the longitudinal axes of the pockets P1 and P2 are parallel and perpendicular to the shaft 20. The axes of the pockets P2 are parallel the reel shaft 20 when the pockets P2 are aligned with the inlet opening 38 of the cooler 14.

As best illustrated in FIGS. 1 and 5, a star wheel lifter 46 is disposed at the discharge end of the cooker and is journaled for free rotation on a shaft 57 in one end wall of the cooker in alignment with the discharge opening 37. The star wheel lifter...
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56 includes teeth 58 which project upwardly between adjacent angle bars 26 of the reel 24 immediately below the cooker discharge opening. As is well known in the art, the monorail flange of each angle bar 26 is relieved at 60 (FIG. 5) to permit the star wheel teeth 58 to project therethrough, and a stationary ring segment 62 is positioned below the relieved portions of angle bars 26 to support the containers until they are moved onto the star wheel 56. The star wheel 56 is driven by the angle bars 26 and lifts the containers from the angle bars and deposits them into the pockets of the transfer turrets P1 and P2.

In order to hold the containers C in the pockets P1 and P2, and to guide the containers from the receiving turret 44 to the delivery turret 46, a guide track 66 is provided. The guide track 66 is best illustrated in FIGS. 1, 2 and 6 and includes an inner guide rail 68 and that is generally S-shaped in plan and a similarly shaped outer guide rail 70 that is likewise generally S-shaped in plan. The rails are in the form of angle bars in cross section passing through the periphery of each transfer turret. As indicated in FIGS. 1 and 5, the inlet ends of the guide rails 68 and 70 are bent downwardly into the cooker discharge opening so as to receive the containers therefrom. The rails 68 and 70 are also spaced a sufficient distance apart to permit the teeth of the star wheel lifter 56 to pass therebetween. Similarly, the discharge ends of the guide rails 68 and 70 project into the inlet opening 38 of the cooker 14 thereby directing the containers into the cooker. If desired, a ledown star wheel (not shown) that is similar to the star wheel lifter 56 may be positioned below the inlet opening 38 to aid in lowering the containers into the cooker reel 24.

At the point of the guide track 66, the containers are shifted from the pockets P1 of the receiving turret 44 to the pockets P2 of the delivery turret 46. In order to effect such transfer, the vertical flange of the inner guide rail 68 FIGS. 2 and 6A) is removed leaving a transfer plate 72 FIGS. 6 and 6A) which supports the containers. Similarly, the upper or outer guide rail 70 has its vertical flange removed leaving a transfer plate 73 thereby permitting the containers to pass therebetween. Strips 74 and 76 are formed by our eagerly flared extensions on the inlet ends of the portions of the rails 68 and 70 that are associated with the turret 46 as indicated in FIGS. 2 and 6 so as to project into the path of the containers when the containers in receptacle pockets P1 thereby strapping the containers from pockets P1 and guiding them into delivery pockets P2.

As indicated in FIGS. 1 and 3, the guide rails 68 and 70 are connected together and the cooker and cooler by a plurality of straps 78. The entire transfer mechanism 10 is preferably disposed within a protective housing 79 that is secured to the cooker and cooler.

As diagrammatically illustrated in FIG. 4, the cooker and cooler reels 24, 24', the rotor 41 (FIG. 3) of the pressure feed valve 36, the rotor of the pressure discharge valve 40, and the transfer turrets 44 and 46 are driven by a drive system that receives its power from motor M. The motor M drives the pinion 32 that meshes with the bull gear 34 that is keyed to the cooker shaft 20'. Since the cooker and cooler shafts 20, 20' are interconnected by the coupling 22, the reels 24, 24' of the cooker and cooler are driven at the same speed. The rotor of feed valve 36 is connected to the cooker shaft 20' by a chain drive 92, and the rotor of the discharge valve 40 is connected to the cooler shaft 20' by a chain drive 94. The transfer turrets 44 and 46 are driven by a chain drive 96 which connects the cooker shaft 20 to an idler shaft 98 having bevel gears 100 and 102 thereon which mesh with bevel gears 104 and 106 keyed to the transfer turret shafts 48 and 50 thus driving the two transfer turrets at the same speed and in opposite directions. It will be understood that the gear ratios and sprocket ratios, such as to cause the containers to be transferred one at a time between the reels and the associated pockets of the transfer turrets and feed and discharge rotors.
mounted for rotation about axes angled relative to each other and angled equal amounts relative to a horizontal axis, means for driving the turrets in timed relation so that pockets in said turrets register when at said transfer station, feed means for directing a container into a receiving pocket in said receiving turret, transfer means at said transfer station for moving the container out of said receiving pocket and into a delivery pocket in said delivery turret, and guide means for retaining the container in said receiving pocket while moving from said feed means to said transfer station and for retaining the container in said delivery pocket while moving from said transfer station to a discharge station, said guide means being effective to support the container during transfer at said upper transfer station from said receiving to said delivery turret.

2. A transfer mechanism for conveying containers between axially aligned food-processing apparatus, each apparatus having an inlet and an outlet and movable container carriers therein, comprising receiving and delivery rotatable turrets, means on said turrets for engaging a container, said container-engaging means on said receiving turret being positionable upon rotation from confronting relation with the outlet of a first of said food-processing apparatus into confronting relation with the container engaging means of said delivery turret, the container-engaging means of said delivery turret being positionable upon rotation from confronting relation with the container-engaging means of said receiving turret into confronting relation with the inlet of a second of said food-processing apparatus, means for guiding the containers into said container-engaging means, and means for moving said turrets in timed relation with the movement of said container carriers for moving the containers from the outlet of the first food-processing apparatus to the inlet of the second food-processing apparatus.

3. A transfer mechanism for transferring containers between two container-handling apparatus comprising receiving and delivery turrets having container-accommodating pockets in their peripheries, said turrets being substantially tangent at a transfer station and being mounted for rotation about axes angled relative to each other, means for driving the turrets in timed relation so that pockets in said turrets register when at said transfer station, feed means for directing a container into a receiving pocket in said receiving turret, transfer means at said transfer station for moving the container out of of said receiving pocket and into a delivery pocket in said delivery turret, and guide means for retaining the container in said receiving pocket while moving from said feed means to said transfer station and for retaining the container in said delivery pocket while moving from said transfer station to a discharge station, said two container-handling apparatus having longitudinal axes that are in axial alignment and said turret axes being disposed at 45° to the axes of the container handling apparatus and at 90° to each other.

4. A transfer mechanism for transferring containers between two container-handling apparatus comprising receiving an delivery turrets having container-accommodating pockets in their peripheries, said turrets being substantially tangent at a transfer station and being mounted for rotation about axes angled relative to each other, means for driving the turrets in timed relation so that pockets in said turrets register when at said transfer station, feed means for directing a container into a receiving pocket in said receiving turret, transfer means at said transfer station for moving the container out of said receiving pocket and into a delivery pocket in said delivery turret, and guide means for retaining the container in said receiving pocket while moving from said feed means to said transfer station and for retaining the container in said delivery pocket while moving from said transfer station to a discharge station, said container-handling apparatus being heat treatment apparatus, said guide means defining a pressure housing secured in fluidtight engagement to said two heat treatment apparatus, and said receiving pocket being sealed in pressuritight relationship to said housing for a portion of its travel.

5. An apparatus according to claim 4 wherein said delivery pocket is sealed in pressuritight relationship to said housing for a portion of its travel.

6. An apparatus according to claim 4 wherein a plurality of receiving pockets are disposed at equal intervals around the periphery of said receiving turret, and an equal number of said delivery pockets are disposed around the outer periphery of said delivery turret.

7. An apparatus according to claim 6 wherein said transfer means includes a pusher pivotally mounted in said receiving pocket and normally disposed in a retracted position, and wherein cam means are provided for moving said pusher from a retracted to an extended position at said transfer station thereby transferring the container from a receiving pocket to a delivery pocket.

8. An apparatus according to claim 7 wherein said delivery pockets are sealed in pressuritight relationship to said housing for a portion of their travel.

9. An apparatus according to claim 4 wherein one of said heat treatment apparatus is a reel and spiral cooker maintained at superatmospheric pressure, and wherein said other heat treatment apparatus is a reel and spiral cooker maintained at different pressure.
CERTIFICATE OF CORRECTION

Patent No. 3,566,774 Dated March 2, 1971

Inventor(s) SAMUEL A. MENCACCI

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Col. 1, line 5, before "Field" delete "l."; line 9, before "Description" delete "2."
Col. 2, line 54, delete "indicate" and substitute -- indicate
Col. 4, line 8, after "only" insert -- those --; line 18, after "by" change "left" to -- leaf --; line 56, after "description" insert -- it --.
Col. 6, line 7, after "ing" change "an" to -- and --.

Signed and sealed this 7th day of March 1972.

(SEAL)
Attest:

EDWARD M. FLETCHER, JR. ROBERT GOTTSCHALK
Attesting Officer Commissioner of Patents